BERMUDA

IMPERIAL BUREAU
13 JULY 1929
OF MYCOLOGY

REPORT

OF THE

DEPARTMENT

OF

AGRICULTURE

FOR THE YEAR

1928

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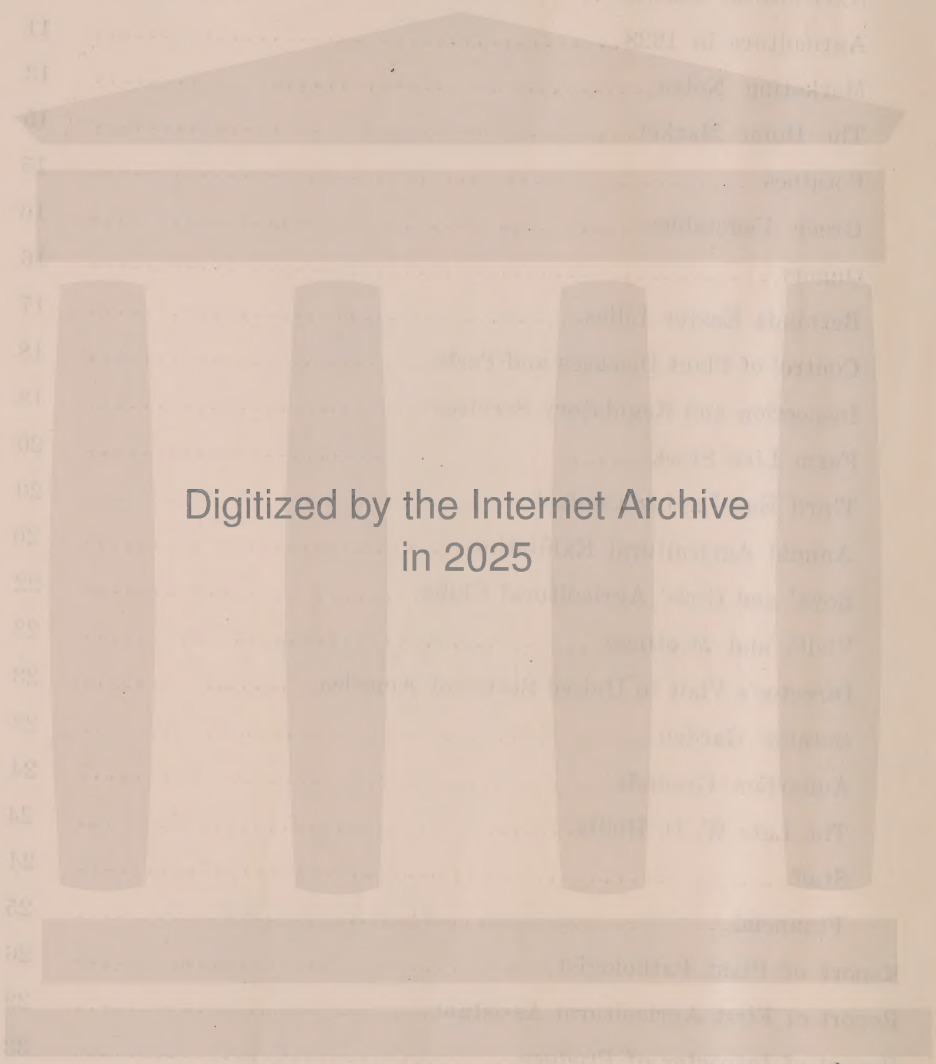

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Board of Agriculture, 1928.

Mr. G. S. PATTON, M.C.P., Warwick, Chairman.
Mr. B. C. C. OUTERBRIDGE, M.C.P., Smiths, Vice-Chairman.
Mr. F. C. MISICK, M.C.P., Sandys.
Mr. M. F. SIMONS, Paget.
*Mr. W. D. HOLLIS, Hamilton.
Mr. W. A. H. BARNES, Southampton.
Mr. F. W. STEPHENS, Paget.
Mr. W. S. PERINCHIEF, M.C.P., Sandys.

Mr. A. W. WEST, Hamilton, with effect from 12th February.
Mr. JOSEPH DE MOURA, Southampton, with effect from 16th February vice Mr. Perinchief, resigned.

Department of Agriculture, 1928.

Director of Agriculture, E. A. MCCALLAN.
Plant Pathologist, LAWRENCE OGILVIE, M.Sc., M.A., B.Sc. (to 8th April).
H. S. CUNNINGHAM, Ph.D., M.S.A., B.S.A. (from 19th June).
First Agricultural Assistant, W. R. EVANS.
Inspector of Produce, E. L. ADAMS.
Horticulturist, J. C. NAUEN (from 16th May).
Clerk, G. L. YOUNG (to 30th April).
F. E. ADAMS (to 16th July).
HILDA C. LINES (from 5th August).

Part-Time Officers.

Government Veterinary Officer, R. L. TUCKER, D.V.S.

Assistant Inspector of Produce, T. A. HOLLIS, Jr.
Sub-Inspectors of Produce, C. V. S. EARLY, E. C. CASE, A. W. DOE.

*Deceased 7th August.

Agricultural Station,
Bermuda,
12th June, 1929.

Sir,

I am directed by the Board of Agriculture to lay before His Excellency the Governor, for the information of the Legislature, the accompanying report of the Department of Agriculture for the year ended 31st December, 1928.

I have the honour to be,
Sir,
Your obedient servant,
HILDA C. LINES,
Clerk, Board of Agriculture.

The Honourable,
The Colonial Secretary,
Hamilton.

Report of The Director of Agriculture.

The Chairman,
The Board of Agriculture,

I have the honour, under the provisions of The Agricultural Department Act, 1921, to submit for the information of His Excellency the Governor my report for 1928. Reports of other members of the Department are also submitted.

AGRICULTURAL STATION.

An account of the principal work performed at the Station follows.

Potato Tests.—As it is proposed to publish in bulletin form a full report of potato work, the subject will be here dealt with briefly.

OBJECTS.—The chief objects of the experiments were (1) to test the various strains imported commercially, and (2) to compare these strains with others obtained by the Department from new sources.

Seed grown in Long Island from stock obtained from the Nebraska Certified Seed Growers Co-operative, when planted in Bermuda, was practically free from virus diseases, and gave yields slightly in excess of other strains. Seed imported direct from the Co-operative for March planting was free from observable diseases, and yielded better than did other strains.

If Dr. F. E. Denny's treatments to hasten the sprouting of dormant potatoes (tested at the Station for three years) can be cheaply and effectively adopted on a commercial scale, larger yields can be expected from northern or western-grown seed than from seed of the same origin planted once in Long Island, for in the majority of the tests made at the Station seed imported direct yielded better than did that from the same sources which had been planted once in Long Island.

Garnet seed from Nova Scotia was satisfactorily free from leaf-roll and other virus diseases though containing slightly more than did the previous year's crop. Good strains of Irish Cobblers are obtainable from many sources.

DISEASE CONTROL.—Late blight was effectively controlled by the use of copper-line dust, but no satisfactory control of early blight has yet come to our notice. Common scab was reduced to a neglible quantity by treating the seed with formalin, and preceding the potato crop with a green manure crop.

FERTILISER TESTS.—A test of castor pomace and a complete potato manure on sale by a local firm gave the following results:

Average yield per rod from castor pomace ..... 127 lbs.
Average yield per rod from complete potato manure ..... 124.4 lbs.

A test of castor pomace and H.O.P., an English fish manure, gave the following results:

Average yield per rod from castor pomace ..... 109 lbs.
Average yield per rod from H.O.P. ..... 103 lbs.

TESTS FOR NEW YORK COLLEGE OF AGRICULTURE. — Potatoes were planted for the New York College of Agriculture.

Vegetables.—Work with vegetables was confined largely to testing for viability and suitability seeds imported by vendors licensed under regulations of the Board. Results of the viability tests, 96 samples, are summarised below:

Very good to fair	84%
Fair	8%
Failed	8%
	100%

Very few of the samples proved to be unsuitable. The quality of the seed imported into the Colony is high. Failure to germinate is generally due, not to the dishonesty of the importer, the reason usually given by the buyer, but to the fact that seeds imported here from England and the United States in the early Autumn were harvested the previous Autumn. In the Horticulturist's report reference is made to Australian-grown seed.

In addition to the seeds tested under the provisions of the Regulations referred to, a further quantity, about 216 samples, was imported direct to compare with the samples submitted by seedsmen. New varieties of superior characteristics have been introduced from time to time in this way. Fisk's Italian Sprouting and Henderson's Riviera are recommended varieties of the green sprouting type of broccoli.

Onions.—Work was continued in the selection of an early maturing type of onion. As stated in former reports, the bulbs are selected in the field in Bermuda, are grown for the Department in California where a further selection is made, and the seed from these bulbs is sown in Bermuda, so that the process of bulb selection may be continued. It is too early to look for results.

Leguminous Green Manure Crops.—As is customary, the greater part of the experimental plots were sown to a summer leguminous crop, chiefly soy beans. For almost the first time in fifteen years very small yields were obtained. This was due to late planting (brought about by influenza among the workmen) and lack of sufficient rain. Despite very infrequent failures, the practice is strongly recommended, particularly on land intended for potatoes.

Tests of Fertilisers.—Fertiliser tests were confined chiefly to potatoes, and have been already reported on. A test on onions gave inconclusive results.

Adco.—Adco synthetic manure was found to be very useful as a potting compost.

Fodders.—Very little fodder grass was planted during the summer of 1928.

The growing of corn (maize) and other fodder grasses is recommended only on heavily manured land. The soy bean is a very valuable fodder plant.

Mulch Paper.—Several small tests of mulch paper on a variety of crops gave unsatisfactory results.

Live Stock.—The Station live stock consisted within the year of the following animals.

GUERNSEY CATTLE.

Montrose Sovereign (106389); sire, Albamont Sovereign; dam, Dora of Atwood's Dairy; born 6th January, 1922 (at Agricultural Station); breeder, J. C. Haartz, Campton, N. H., U. S. A.

Montrose Hector (143022); sire, Albamont Argonaut; dam, Dora of Atwood's dairy: born 24th January, 1927; breeder, Department of Agriculture.

Albamont Juliet (85736); sire, Deanie's May King; dam, Juliana of Gerar; born 20th April, 1918; breeder, J. C. Haartz, Campton, N. H., U. S. A.

Juliana of Montrose (203737); sire, Montrose Sovereign; dam, Albamont Juliet; born 1st November, 1925; breeder, Department of Agriculture.

Julia of Montrose sire, Uncle Sam of Somerville; dam, Juliana of Montrose; born 6th January, 1928; breeder, Department of Agriculture.

BERKSHIRE PIGS.

Highwood Model 209th (332648): male; sire, Highwood Model 139th; dam, Highwood Duchess 224th; born 6th November, 1928; breeders; H. C. and H. B. Harpending, Dundee, N. Y.; U. S. A.

Highwoood Model 232nd (343306), male; sire, Highwood Model 156th; dam, Highwood Starlight 285th; born 18th April, 1927; breeders, H. C. and H. B. Harpending, Dundee, N. Y., U. S. A.

TOGGENBURG GOATS.

Mayfly of Lorraine (18970), male; sire, Steven's Antonio; dam, Ace's Maytime; born, 10th March, 1922; breeder, S. F. Cowling, Middlestown, Va., U. S. A.

Arrowhead (T. T. 201), male; sire, Ace's Arrow, No. 4641; dam, J. T. H. 10; breeder, T. D. John, Beltsville, Md., U. S. A.

La Suise Jupiter (33190), male; sire, Jenk-I Rangy Chief; dam, Nona Alden; born 8th April, 1927; breeders, J. E. and M. B. Ettien, Wareagle, Arkansas, U. S. A.

Nancy (J. T. H. No. 2); sire, El Chevat's Uncas 11; dam, U. S. D. A. No. 199; breeders, United States Department of Agriculture.

Nancy II; sire, Arrowhead; dam, Nancy; born 25th March, 1928; breeder, Department of Agriculture.

Nellie II; sire, Arrowhead; dam, Nancy; born 25th March, 1928; breeder, Department of Agriculture.

Montrose Hector was retained as the herd bull (46 services), and Montrose Sovereign at nearly seven years old was sold to the butcher, being no longer fit for service. Albamont Juliet gave birth to a heifer calf not considered to be worth raising. Juliana of Montrose gave birth on 25th March to a female calf, Julia, which was raised, and promises to be a good dairy animal.

The boar Highwood Model 209th, more than three years old, was too large for service, and was disposed of. The younger boar, Highwood Model 232nd, made 32 services during the year. Another young boar is needed.

The year was full of misfortune for the goats, for no less than four were lost from internal parasites, a trouble difficult to control, and one which it is believed is the cause of much loss in goats in Bermuda The matter is one deserving of study. At the close of the year the goats remaining were La Suise Jupiter and Nancy II.

Attention is again drawn to the need of better cattle stables, larger tankage at the stables and quarters for the cattleman.

Disposal of Produce.—In Appendix B will be found information regarding produce given to other institutions and sold.

Fruit.—A good crop of citrus fruit, particularly grapefruit, was grown. The experience at the Station indicates that citrus fruit of high quality can be grown in Bermuda at a cost below the retail price of imported fruit. Other tropical and sub-tropical fruits can also be grown, if proper care is taken of the trees.

Flower Beds, etc.—See the Horticulturist's Report for information on this subject.

Repairs and Extensions.—The boar pen was completed. The glasshouses were repaired except No. 1. A concrete bench was constructed in No. 3 and a cold frame in No. 5. The offices were improved and renovated. The Inspector's shed at the dock was fitted. Benches and partitions were put up in the Farmers' Market, Hamilton. A new roof was put on the Exhibition office. A fence was erected parallel to a part of the Berryhill Road, and a temporary fence in the south-east pasture; both to protect plants from cattle. The fence around the bull yards, put up in 1923, was reinforced. Improvements were effected to the cattle shed. A trellis was built over the south office door and another over the south gate. Gates were placed in the hedges around the Director's kitchen yard.

Prison Labour.—Prison labour aggregating 1,070 man-days was employed in removing rock from the new field, grading and turfing, and in preparing the grounds for the Exhibition.

Office Work.—During the year 1,555 letters were received and 1,814 despatched. Other routine work was satisfactorily performed, but little time could be given to the preparation of permanent records and the indexing of literature. The Plant Pathologist revised and extended the method of indexing pathological literature, but much remains to be done in this subject and others. An addresser was purchased.

Publications Received.—Acknowledgment is gratefully made of the many valuable publications received from agricultural and other scientific institutions.

Publications Issued.—Chief among the publications of the year was "The Insects of Bermuda" (54 pp.) by Mr. Lawrence Ogilvie, formerly Plant Pathologist; 1,000 copies were printed. The annual publications were as follows: 600 monthly copies of the Agricultural Bulletin, 500 copies of the Report for 1927, and 700 copies of the Exhibition Catalogue. During the shipping season nearly 200 post-cards containing the New York prices of Bermuda vegetables were issued weekly.

Visitors.—A number of agricultural workers visited the Station, as well as others interested in agriculture. Among the visitors were His Excellency the Governor, Sir Louis Jean Bols; Lord and Lady Elphinstone; Sir Joseph Moline; Major Sir C. W. J. Orr, Governor of Bahamas; Mr. Frederick Newbold, Secretary of the New York Horticultural Society; Dr. Irene Duboski of the Boyce Thompson Institute for Plant Research; Mr. W. A. Lloyd and Mr. H. L. Westover of the United States Department of Agriculture; Mr. W. J. Coxey of the Academy of Natural Sciences, Philadelphia; and Mr. E. R. Meacham of the Division of Rural Science, Wisconsin.

The number of visitors who enjoy the beauty of the grounds is increasing. Farmer visitors were increased by meetings held here. At the time of the Annual Exhibition several thousand people visited the Station, but only a few found time to enjoy the flower beds and other features.

AGRICULTURE IN 1928.

The year under report was more unfavourable to Bermuda agriculture than was the year preceding it. The crops reaped were slightly larger than those of 1927, and exports were 13 per cent larger, but prices in New York, our principal market, were distinctly below those of the year before. This alone would have resulted in reduced profits, but two circumstances occurred which might be termed calamities.

Growers of Portuguese kale were induced to plant freely, and many lost heavily because of over-production, yet this circumstance was of small importance when compared with the conditions attending the sale of celery. The crop was the largest ever reaped and of excellent quality. Having regard to the very large Florida crop, particularly of late celery, prices were fair up to about 8th May. Much of the crop had been purchased locally at prices which in the light, at least, of after events were unwarranted, and which could scarcely have been justified at the time. About 11th May the buyers set a price on their celery, and decided to hold in anticipation of an advance in price. This looked for advance never came, and about 40,000 crates or approximately two-thirds of the crop became a total loss in so far that sales did not cover charges. The crop was largely the property of merchants and not farmers, but the heavy loss which the former sustained has been reflected unfavourably in their future trading with farmers, and adjustments in some cases have been slow for celery which had been shipped on consignment and stored with the merchants.

The quantities of potatoes, onions and other vegetables exported during the last ten years are as follows:

1919	538,126	bushels
1920	513,938	"
1921	470,225	"
1922	379,082	"
1923	318,761	"
1924	416,604	"
1925	313,280	"
1926	426,896	"
1927	371,887	"
1928	420,802	"

The quantity exported in 1928 was 113 per cent of the previous year's export, and 102 per cent of the average of the last ten years.

The gross value of the exported crop (exclusive of lily buds) was as follows:

TO THE UNITED STATES OF AMERICA.

Beets, 15,507 crates @ $1.14	$ 17,678
Carrots, bunched, 15,799 crates @ $1.16	18,327
Carrots, loose, 21,972 crates @ $1.64	36,035
Celery, 64,598 crates @ $1.60	103,357
Kale, 13,827 crates @ $4.50	62,221
Lettuce, 1,375 crates @ $1.35	1,854
Onions, 2,878 crates @ $2.00	5,756
Parsley, 60,318 crates @ $1.49	89,874
Potatoes, 40.811 barrels @ $9.25	377,502
Turnips, 1,473 crates @ $1.22	1,797
Miscellaneous vegetables, 468 crates @ $1.50	702
Lily bulbs, 7,064 cases @ $10.00	70,640
	$785,743=£163,696

TO THE DOMINION OF CANADA.

Carrots, 4,458 crates @ $1.75	$ 7,801	
Onions, 11,205 crates @ $1.50	16,807	
Tomatoes, 4,752 crates @ $1.50	7,128	
Miscellaneous vegetables, 1,118 crates @ $1.50	1,677	
Easter lily bulbs, 241 cases @ $10.00	2,410	
Other bulbs, 50 cases @ $12.00	600	
	$ 36,423	=£ 7,588

TO GREAT BRITAIN.

Lily bulbs, 200 cases @ £2. 0.		£ 400

TO BRITISH WEST INDIES.

To the West Indies were shipped 2,423 crates, principally onions, but the shippers state that the expenses of the shipments were scarcely met by the results of the sales.

TO OTHER COUNTRIES.

Lily bulbs, 56 cases @ $10.00	$ 564	=£ 117
		£171,801

The estimated local value of all agricultural products is given below:

EXPORTED.

To United States of America	£ 86,601	
To Dominion of Canada	4,942	
To Great Britain	300	
To other countries	95	£ 91,938

CONSUMED LOCALLY.

Potatoes and other vegetables	£ 60,000	
Bananas	15,000	
Milk	67,000	
Eggs and poultry	28,000	
Pork, veal and beef	20,000	£190,000
		£281,938

The above estimate is 86 per cent of that of the previous year, and with respect only to exports 69 per cent.

Below are given the estimated local values of agricultural products for the previous four years:

1924	£366,000
1925	270,500
1926	375,526
1927	324,128

The average New York prices in 1913 (pre-War), for the six-year period 1923 to 1928 and for 1928 are given below:

	1913	1923—1928	1928
Beets	$ .97	$ 1.44	$ 1.14
Carrots	95	1.59	1.40
Celery	3.40	*6.13	—
Lettuce	1.34	1.40	1.33
Onions	1.53	2.38	2.00
Parsley	1.07	2.20	1.40
Potatoes	5.97	12.38	9.25

*1923—1927 only.

The Bermuda farm prices, crated, were as follows in 1928:

Beets	£–	2	0½
Carrots, bunched	–	1	11½
Carrots, loose	–	3	2½
Lettuce	–	2	5
Onions	–	4	5½
Parsley	–	2	11½
Potatoes	1	7	6

Agricultural exports were approximately divided among our four markets as follows:

United States of America	95 per cent
Dominion of Canada	4 " "
British West Indies	0. 9 " "
Great Britain	0. 1 " "

MARKETING NOTES.

The marketing of Bermuda produce continued to receive attention during the year under report, yet results cannot be said to be commensurate with the effort expanded.

It has already been stated that the year was one unfavourable to local agriculture, yet Bermuda farmers should not be blind to the fact that world agriculture is more or less depressed.

The marketing of Bermuda produce, like the marketing of most countries' produce, results largely in cheap vegetables for the producer and dear vegetables for the consumer.

The Canadian Market.—The new boats of the Canadian National Steamships have renewed Bermuda's interest in the Canadian market. The new boats supply, in part, the lack of proper steamship service which has so long existed, but the future must bring more frequent service and larger chill-room space. A Bermuda-Canada weekly service will be needed to fully supply the requirements of a profitable vegetable export trade to the Dominion.

All interested in the development of the trade should bear in mind that we are entering a market which is practically a new one, in which our vegetables are unknown and in which our competitors are well established. We enter this market however, with advantages on our side regarding duties and freight rates, and failure to establish ourselves therein will be largely due to our neglect to offer goods of high grade and attractively packed. However rigidly the Department's inspection regulations may be enforced, they cannot take the place of a desire on the part of farmers and shippers to sell goods of the highest quality.

Advertising Lily Bulbs in England.—The scheme of advertising our bulbs in the schedules of horticultural societies, which was developed by Mr. F. H. Burn of Pratt and Company (Advertising), Limited, London, was well carried out this year. The advertisements appeared in nearly sixty schedules, and twelve bulbs were given in exchange to each society and used as a special prize. In addition, advertisements appeared in the publications of the Royal Horticultural Society and in other publications. The total cost was £126, inclusive of the cost of bulbs for prizes and for planting in public parks. Other related information will be found under "Bermuda Easter Lilies".

Representative in New York.—Mr. T. Arthur Hollis, Assistant Inspector of Produce, was in New York during the greater part of the season, and kept the Department informed of the state of the market from week to week. This information was made public by telephone, press articles and post cards.

Shipment of Potatoes in Bushel Crates.—The Department has made several experimental shipments of potatoes in containers which appeared more suitable than barrels, and during the latter part of 1928 arrangements were made to test the suitability of paper lined, well made bushel crates. The experiment was well received by the trade. Bermuda potato growers should be aware that domestic and Cuban potatoes are now sold in the United States in small packages, and we, too, may find it to our advantage to adopt this method of sale.

Shipment of Tomatoes to the States.—The Department is pleased to report that Bermuda tomatoes are permitted entry into the United States as from 1st September, 1928.

Samples of Potatoes to England.—Samples of potatoes were sent to England with the object of again testing the possibilities of that market. Further shipments will be made.

Chill-Room Accommodation.—Sufficient chill-room accommodation was found for celery in the "Fort Victoria" sailing from Bermuda weekly. This was due to the fact that harvesting was spread over a longer period than usual. Two boats weekly during May and early June woulld relieve celery growers of much anxiety.

Shipment of Produce Act.—Following are the shippers licensed and bonded under the Act:

Bermuda Green Vegetable Growers' Association.
J. M. Darrell.
R. Darrell and Company.
Henry Dunkley and Company.
The Hill Company.
Ingham and Wilkinson.
O. R. Loblein.
John P. Mello.
G. J. Moniz.
H. T. North.
Pearman, Watlington and Company.
J. Perry and Company.
M. F. Simons.
B. W. Walker and Company.
W. A. Young.

Under the authority of the Act the shippers were approached regarding shipments of celery and kale. The matter was not finally adjusted at the close of the year, but some of the shippers showed commendable liberality in the matter.

Empire Marketing Board.—The Department's first contact with the Empire Marketing Board was made in 1926, on the occasion of Mr. Ogilvie's visit to England. Since then the Board has been addressed on a variety of subjects. Its chief service to Bermuda has been in connection with the advertising of Bermuda Easter lily bulbs. At the suggestion of the Board, lily bulbs were sent to the Commissioner of Parks (London) and were planted in Hyde Park. The greatest publicity was thus secured, not alone through the many visitors to the Park who saw the lilies in bloom, but through the press articles prepared by the Board for insertion in many leading English and Scottish papers.

Employment of Marketing Export.—The Board considered for a long period the employment of a marketing expert with full knowledge of the sale of vegetables in New York. No action was taken during the year under report.

Relief by Co-operative Marketing.—Reference is made elsewhere to the failure of the lily growers to form a co-operative selling organisation. Agricultural co-operation has done much to help other farmers and should commend itself to the farmers of Bermuda. On his retirement as United States Secretary of Agriculture, the Honourable W. M. Jardine said that it was his opinion, after many years' experience, that in co-operative marketing lay the only help for farmers.

THE HOME MARKET.

During the year under report the Farmers' Market in Hamilton was provided with suitable quarters by the Corporation of Hamilton. As the Market at last occupies a building of its own, it may not be out of place to briefly outline its history.

A produce market in Hamilton appears to have been first brought to the attention of the Board on 12th March, 1913, by its then Chairman, Mr. F. Goodwin Gosling. Plans of a building were prepared by the Department of Works, sites were discussed and regulations framed when, on the outbreak of the Great War, the project, which even then had been greatly delayed, was pigeonholed like many another. The erection of a market building was abandoned for the time, and attention was given to the establishment of a street or curb market, but even so simple a project as this did not mature with any rapidity, and it was not until 3rd January, 1923, that a market was opened on the area north of Point Pleasant Hotel and west of the Transportation Wharf, this space having been set aside for the purpose by the Corporation of Hamilton. Shortly after, the space was required for another purpose, and the market was moved to the upper floor of No. 6 Shed. The building was given rent free by the Corporation, subject to the movement of steamers needing it for docking purposes, and no charge was made to farmers for the use of the stalls. The market was open on Wednesdays and Saturdays and less than half a dozen farmers sold in it. The market, however, both reduced the retail price of produce and stimulated its sale.

Throughout the history of the market a strong interest had been taken in it by the Corporation and particularly the Mayor, the Worshipful A. W. Bluck, O.B.E., J.P., M.C.P., and when in 1928 a small committee of the Board approached him regarding a building to be used solely for the market, it was sympathetically received, and a large room near No. 6 Shed was rented to the Department at £50 per year. Stalls were built by the Department, and assistance was afforded by the Corporation in fitting the building for the purpose of a market. On 17th November, 1928, His Excellency the Governor formally opened the market in its new home, where it is now open for sales daily except Sundays. Vegetables, eggs and pork are the principal items sold.

POTATOES.

The exports of potatoes for the last ten years were as follows:

1919	87,096	barrels
1920	58,674	"
1921	58,955	"
1922	41,999	"
1923	33,604	"
1924	35,254	"
1925	23,488	"
1926	34,475	"
1927	36,072	"
1928	41,301	"

The quantity exported in 1928 was 114 per cent of the exports of the previous year and 84 per cent of the average of the last ten years. Because of low prices at the close of the season more potatoes remained in the Colony than usual. Unfortunately, considerable loss occurred through rot in the potato stocks held for local sale. This loss could have been greatly reduced by the proper control of blight (the chief cause of loss) and care in harvesting and storing. The local consumption of potatoes is increasing, and exports do not now represent as large a proportion of the crop as formerly.

Prices in New York for Bermuda potatoes have declined during the last two years as shown below:

1923	1924	1925	1926	1927	1928
$12.97	13.00	14.00	14.75	10.31	9.25

The chief cause of this decline is the development of potato growing in Cuba. New Bermuda potatoes continue to be a class by themselves, and as a rule sell in advance of potatoes from other localities, but Cuban competition is likely to prevent a return of former high prices except in seasons of scarcity. Competition makes it necessary to grade and pack our potatoes better than do our competitors.

GREEN VEGETABLES.

Exports of green vegetables during the last ten years were as follows:

1919	162,517	bushels
1920	260,784	"
1921	263,649	"
1922	191,806	"
1923	193,974	"
1924	230,745	"
1925	216,891	"
1926	284,135	"
1927	255,765	"
1928	294,623	"

The quantity exported in 1928 was 114 per cent of the quantity exported in 1927, and 134 per cent of the yearly average of the last ten years.

As already stated, prices in New York were low for all vegetables, and an unprofitable season was changed into a disastrous one by the circumstances connected with the marketing of celery and kale.

According to the United States Bureau of Railway Census, shipments of vegetables and fruits by rail have doubled during the last ten years. In addition, far larger quantities are now hauled to market by road than formerly. Frequently it is difficult, if not impossible, to obtain profitable prices for all vegetables offered for sale, and quality is now of far greater importance than formerly when the demand generally exceeded the supply. Bermuda farmers must learn to grade and pack better each succeeding year.

ONIONS.

Exports of onions during the last ten years were as follows:

1919	131,271	bushels
1920	109,072	"
1921	49,455	"
1922	70,874	"
1923	35,176	"
1924	41,848	"

1925	21,170	bushels
1926	39,336	"
1927	19,930	"
1928	16,063	"

The quantity exported in 1928 was 80 per cent of that exported the previous year and 24 per cent of the yearly average of the last ten years. During the ten years ended 1900 a yearly average of 315,715 crates was maintained.

As mentioned under "Agricultural Station," a selection of early-maturing seed is now being made. Though the onion market in the United States has passed from our hands, an earlier maturing onion should increase our profits in the Canadian market if it is corelated with high quality. It is yet too early to look for results in the development of the desired strain, but at the time of writing (May, 1929) it appears that success may be achieved.

BERMUDA EASTER LILIES.

Exports of Bermuda Easter lily bulbs during the last ten years, according to Customs returns, were as follows:

1919	664	cases
1920	749	"
1921	936	"
1922	1,604	"
1923	3,116	"
1924	3,539	"
1925	4,040	"
1926	4,524	"
1927	6,043	"
1928	7,611	"

The quantity exported in 1928 was 126 per cent of that exported the previous year, and 292 per cent of the yearly average of the last ten years. The continued increase in bulb exports is most gratifying. The United States of America continues to be our principal market for bulbs, but increasing quantities are being exported to Great Britain, Canada and elsewhere.

The quality of the bulbs continues to improve. The gratitude of the growers is due Mr. Lawrence Ogilvie, late Plant Pathologist of the Department, for his untiring efforts in the improvement of Bermuda bulbs. Not alone is the quality of Bermuda bulbs better than ever before, but they are the equal if not superior to any other Liliums with respect to freedom from disease and trueness to type.

Of great benefit to the Department's investigations has been the Lily Disease Investigation Fellowship of the Horticultural Society of New York, the Boyce Thompson Institute for Plant Research, Cornell University and the New York Botanical Garden. The Research Fellow, Mr. C. E. F. Guterman, visited Bermuda during the lily season, and Dr. Cunningham inspected Bermuda lilies in glasshouses when in the States at the close of the year. This close collaboration is securing valuable information regarding the most effective means of controlling disease in our lilies.

It is to be regretted that the price of Bermuda bulbs has not kept pace with their quality, but that the reverse has been the case. The fault is to be laid at the door of the growers and shippers. No reduction has taken place in the demand for our bulbs, nor has competition depressed the price. Lack of co-operation and absurd selling practices are alone to blame. At the request of the growers, the Department assisted in the organisation of a co-operative selling organisation. A majority of the growers were

favourable to the proposal, as were a number of the shippers, but in the end the desired percentage of signatures to the contracts was lacking. It is evident, however, that some growers' organisation is essential.

Amendments to the regulations governing the grading and sale of lily bulbs is referred to under "Inspection and Regulatory Services".

In last year's Report mention was made of the resignation of Mr. Lawrence Ogilvie, Plant Pathologist, which took place on 8th April, 1928, when he sailed for England to take office under the Ministry of Agriculture and Fisheries. Mr. Ogilvie has lost none of his interest in and love for the Colony, and has been of great benefit to the lily industry since his return to England by investigating alleged cases of failure of our bulbs, and by directing attention to our bulbs by his excellent articles which have been published.

On 16th June Mr. Ogilvie was succeeded by Dr. H. S. Cunningham, who since his appointment has devoted the major part of his attention to this crop.

Any reference to lilies, however brief, would be incomplete without mention of the excellent work of Messrs. Robert Tucker and Company and Mr. F. H. Burn of Messrs. Pratt and Company (Advertising), Limited, in increasing the sales of our bulbs in England.

CONTROL OF PLANT DISEASES AND PESTS.

Attention is directed to the report of the Plant Pathologist.

The Friend motor spraying pumps were employed as follows:

St. Georges	4½	days
Hamilton	½	"
Smiths	13¾	"
Devonshire	12¾	"
Pembroke	6½	"
Paget	14½	"
Warwick	3¾	"
Southampton	9	"
Sandys	3½	"
Total	68¾	days

Employment last year totalled 55½ days.

Blower dust guns were hired out for 3 days only. A horse duster (Niagara) was purchased for demonstration purposes chiefly. It was not used on a crop, but when tested experimentally it appeared to be highly suitable for use on potatoes, and should prove a labour-saving tool.

INSPECTION AND REGULATORY SERVICES.

The inspection services of the Department relate to the following:

(1) **Contagious Animal Diseases.**—All imported domestic animals are subject to inspection on arrival, and all premises used for the keeping or slaughter of animals or the storage or sale of animal carcasses are subject to inspection by the Government Veterinary Officer. Representation was made to one of the steamship companies with respect to conditions under which cattle were carried, which conditions were improved. No serious outbreak of infectious disease occurred during the year. Three dairy cattle were disposed of because of tuberculosis. The Government Veterinary Officer's report deals further with this subject.

(2) **Produce Exported.**—All produce, namely, potatoes, onions and other vegetables, is subject to inspection on the dock prior to shipment. The Department is indebted to the Corporation of Hamilton for a convenient office for the use of the Inspectors. Further information on the inspection services will be found in the Inspector's report.

(3) **Seed Potatoes.**—Importers of seed potatoes are required to satisfy the Director regarding the nature of the seed potatoes which they propose to import. State certified seed only may be imported.

(4) **Lily Bulbs and Other Nursery Stock Exported.**—New Regulations were made governing this important industry. It is now necessary for exporters of bulbs to give bond, and the field inspection of bulbs is better safeguarded. All nursery stock to be exported should be inspected and certified by the Department.

(5) **Nursery Stock Imported.**—All imported nursery stock is subject to inspection.

(6) **Vegetable Seeds Imported for Sale.**—Certain vegetable seeds are subject to test for viability and trueness to type. Celery seed is further tested for the presence of blight pustules. The following persons and firms were licensed as seedsmen:

Bermuda Green Vegetable Growers' Association.
Henry Dunkley and Company.
Fairy Isle Flower Shop.
The Hill Company.
O. R. Loblein.
G. J. Moniz.
The E. W. Outerbridge Company.
J. H. P. Patterson.
Peniston and Curtis.
A. J. Saintes.
L. N. Tucker.
T. J. Wadson and Son.

(7) **Control of Local Plant Diseases and Pests.**—Regulations relating thereto are in force.

Conditions under which Plants May be Imported.—All living plants and parts thereof (except seeds) intended for planting, bananas and citrus fruits are subject to inspection at the dock or Post Office, according to the manner of importation. No permits to import are required, except for seed potatoes.

Prohibited Plants.—The following plants and parts thereof are prohibited:

(a) Banana plants and parts thereof, except fruit.

(b) Antirrhinum or snapdragon plants.

(c) Citrus plants and citrus fruits (unless the latter are free from leaves and portions of the plants) imported from the West Indies and the Bahamas.

(d) Irish potatoes from Great Britain and Ireland, Europe, Newfoundland, St. Pierre and Miquelon, and Chili Garnet and Bliss Triumph potatoes from all sources unless conforming to seed potato regulations.

(e) Sweet potatoes from the United States of America, Cuba, the Bahamas, British Guiana, Jamaica, the Canal Zone and Porto Rico.

(f) Carrots in their raw or untreated state.

(g) All bulbs belonging to the genera Narcissus and Lilium.

(h) Indian corn or maize in the ear, broom corn and other sorghums, and sugar cane in the raw or untreated state.

FARM LIVE STOCK.

Reference has already been made to the Department's breeding stock. The beneficial effects of this pure-bred stock and other, particularly the Guernsey cattle of Mr. B. C. C. Outerbridge, M.C.P., are becoming more and more evident. Some attention was given during the year to pure-bred rabbits. His Excellency the Governor has taken interest in the possibilities of Angora rabbit raising which is being enquired into. The Department is prepared to assist importers of pure-bred breeding stock by giving advice regarding where to purchase and attending to the importations. Mr. W. R. Evans is always pleased to give advice regarding poultry. The Annual Agricultural Exhibition undoubtedly has done much to encourage the breeding of better farm live stock.

Greater attention should be given to the local production of milk and eggs, and the use of milk should be encouraged by all interested in the health of the community. The work of the Department of Health, in relation to the production of cleaner milk, and the presentation by Dr. Henry Wilkinson of an handsome silver and bronze challenge shield for the best kept dairy herd are bringing excellent results. The education of school children regarding the benefits of including in their dietary fresh milk and vegetables might well engage the attention of the proper authorities.

The Bermuda Poultry and Pet Stock Association held their annual show at the Station on 8th and 9th February. The Association is doing good work in the interests of poultry.

At the close of the year the veterinarians practising in the Colony asked for registration.

THIRD EGG-LAYING CONTEST.

The Colony and particularly poultry breeders are deeply indebted to Mr. L. W. Howarth for operating on his farm the third egg-laying contest. A report of the contest is presented by Mr. W. R. Evans, First Agricultural Assistant.

ANNUAL AGRICULTURAL EXHIBITION.

The tenth Annual Agricultural Exhibition was held at the Station on 17th, 18th and 19th April. Again several records were made, and the place "the exhibition" holds in the interests of the community was once more demonstrated.

The interest in the Exhibition is illustrated by the steadily increasing number of entries, and the willingness of many to assist. More than two hundred voluntary workers are to be found each year on the grounds of the Exhibition, and not the least of the benefits resulting from the show is the community spirit thus encouraged and given opportunity of expression, nor would it be desirable, were it possible, to hold the Exhibition without the valuable help of the voluntary workers.

Those who most benefit by the Exhibition are the youth of the Colony. Each year the exhibits from the Boys' and Girls' Agricultural Clubs are more numerous and of better quality. The Exhibition offers to these young people the chief, if not the sole, encouragement to excel in handicraft, the care of live stock and the cultivation of plants. Particulars regarding club exhibits will be found on a following page.

To encourage the exhibiting of vegetables several hundred small packets of vegetable seeds were distributed to adult and Club exhibitors of vegetables.

In 1927 it was necessary to approach the Legislature for a supplementary grant, and in the year under report no balance was carried over. The requirements of the Exhibition with respect to larger buildings and the like are too numerous for insertion in this report, but it should be apparent to all that a show for which more than five thousand entries are now received cannot be operated at the same cost as in the past when entries numbered one thousand and less.

The following figures show the growth of the Exhibition since 1922 when it was first held after the Great War, and a comparison between 1927 and 1928:

	1922	1927	1928
Estimated number present	7,300	13,000	15,000
Number of entries	964	4,208	4,702
Value of prizes	£ 242	£ 548	£ 573
Total receipts	£ 611	£1,243	£1,117
Total expenditure	£ 503	£1,243	£1,117

Below are given in detail the number of entries in 1922, 1927 and 1928:

	1922	1927	1928
Horses	86	132	160
Cattle	46	74	81
Pigs	2	12	11
Goats	25	24	44
Rabbits	13	96	87
Poultry	37	289	362
Dogs	43	61	81
Vegetables	88	560	415
Fruits	9	38	84
Flowers	181	926	1,164
Food Products	136	615	733
Arts and Crafts	291	1,378	1,480
Miscellaneous	7	—	—
Totals	964	4,208	4,702

STATEMENT OF RECEIPTS AND EXPENDITURE.

RECEIPTS.

	1927	1928
Balance brought forward	£ 1 9 11	£ 1 12 3
Granted by Appropriation Acts	300 0 0	300 0 0
Granted by Resolve No. 15 of 1927	140 0 0	– – –
Donated by Trade Development Board	37 18 8	– – –
Donated by sundry persons for prizes	12 14 0	10 3 0
Gross receipts for advertisements in catalogues and programmes	137 11 11	131 3 0
Ground rent for stalls	68 15 0	55 6 6
Commission on amusement stands	– – –	8 2 7
Post entry fees	38 17 6	19 18 6
Gate receipts	377 15 8	431 13 4
Enclosure receipts	104 15 8	112 12 2
Bicycle receipts	– – –	31 2 2
Unpaid adult prize money	15 8 6	14 13 6
Sundry	8 0 8	1 10 0
	£1,243 7 6	£1,117 17 0

EXPENDITURE.

Prizes to adults	£ 402 17 6	£ 417 8 0
Prizes to Agricultural Clubs	120 17 6	138 6 6
Prizes for sports	24 16 0	19 16 9
Advertising	35 5 5	22 0 6
Printing catalogues and programmes and commission on advertisements	111 8 0	86 2 6
Stationery and other printing	51 7 6	39 5 10
Lumber	79 18 8	32 1 1
Other material	128 7 2	79 10 10
Bands	50 0 0	30 0 0
Carriage and teas for bands and others	14 3 1	15 4 11
Carriage of exhibits	7 16 0	9 19 0
Labour, field	72 2 0	80 16 7
Watchmen	7 0 0	6 0 0
Gate-keepers	30 0 0	26 17 6
Checking bicycles	– – –	11 0 0
Clerical	42 5 8	50 17 8
Police	5 0 0	– – –
Cartage	15 6 6	17 10 0
Depreciation, rental, etc., of Government stores	26 3 1	21 8 3
Light, telephone and miscellaneous	17 1 2	13 11 0
Balance	1 12 3	– – 1
	£1,243 7 6	£1,117 17 0

A number of special prizes were given in connection with the Exhibition. These prizes should encourage competition. Below are given the names of the donors and winners:

His Excellency the Governor, General Sir J. J. Asser, K.C.B., K.C.M.G., K.C.V.O., silver presentation cup (first presented in 1927) for Parish showing most marked improvement over its previous year's performance. Won by Paget Parish, and held by Mrs. T. M. Doe.

Messrs. James Carter and Company, Raynes Park, England, silver challenge cup for best collection of vegetables and flowers (six of each) grown from firm's seeds. No competition.

Bermuda Society for Prevention of Cruelty to Animals, two pounds and one pound for best hack horse from stables of not more than four horses. Won by Mr. H. Bean Wilson, Pembroke, and Mr. E. Hatherly, Pembroke.

Mr. M. A. Gibbons, one pound and ten shillings for best truck horse. Won by Mr. Fred Smith, Pembroke, and Mr. P. A. Dodwell, Paget.

Mr. J. T. Trimingham, one pound for best truck horse. Won by Mr. P. de Silva, Devonshire.

BOYS' AND GIRLS' AGRICULTURAL CLUBS.

The activities of the Boys' and Girls' Agricultural Clubs centre around the Annual Agricultural Exhibition. The Woodlands School Club (Pembroke) is to be commended on its annual school exhibition held in advance of the Agricultural Exhibition. Warwick Academy and Sandys Grammar Clubs are in possession of school gardens.

Below is given a comparison of Club entries received in 1922, 1927 and 1928.

	1922	1927	1928
Horses	4	2	6
Cattle	4	5	8
Pigs	–	–	–
Goats	10	16	19
Rabbits	10	75	65
Poultry	10	108	147
Dogs	6	22	31
Vegetables	33	259	166
Fruit	–	18	37

Flowers	9	372	388
Food Products	37	398	490
Arts and Crafts	173	1,152	1,276
Miscellaneous	4	–	–
Totals	300	2,427	2,633

The liberal special prizes given by those interested in the work of the Clubs did much to encourage the members. Below are given the names of the donors and winners of the prizes.

Mr. W. J. H. Trott, M.C.P., silver presentation cup for Club showing most marked improvement over its previous year's performance. Won by West Pembroke School Club.

Mrs. James A. Conyers, ten shillings each for best plain sewing by a girl between nine and eleven years old and a girl less than eight. Won by Ismay Dowling, Southampton Glebe School Club, and Laura de Moura, Greenfields School Club.

Mr. Lawrence Ogilvie, Britton's Flora of Bermuda and two cash prizes of ten shillings each for pressed Bermuda wild flowers. Won by Ruth Ingham, Mary Butterfield and Freda Mansbridge, all of Bermuda High School Club.

Somerset Garden Club, prizes for competition in Sandys Grammar School. Won by Lorna Griffiths and Olive Matthews for best school flower garden cultivated by girls, by Vivian Burrows for best school vegetable garden cultivated by a boy, and by John Young for best school flower garden cultivated by a boy.

Mr. W. R. Perinchief, ten shillings for competition in East End Grammar School. Won by Cora Minors.

VISITS AND MEETINGS.

More recorded visits were paid to farms, gardens and schools than in any previous year. Three farmers' meetings were held at the Station, also several meetings of lily growers. Schools, garden clubs and arbor societies were addressed. Meetings of seed potato importers were addressed. The Department's demonstration booth at the Somerset Flower Show on 10th May was well patronised.

Parish	Dir.	P.P.	Asst.	I.P.	Hort.	G.V.O.	Totals
St. Georges	19	67	52	50	10	8	206
Hamilton	10	20	24	29	37	15	135
Smiths	14	22	63	25	9	21	154
Devonshire	17	33	42	36	9	20	157
Pembroke	13	46	51	25	18	39	192
Paget	51	76	95	46	20	23	311
Warwick	49	12	32	27	10	14	144
Southampton	22	8	16	13	4	5	68
Sandys	10	22	17	10	10	7	76
Totals	205	306	392	261	127	152	1,443

DIRECTOR'S VISITS TO THE UNITED STATES.

Reports were presented by the Director on his return from the United States of America on 2nd January and 26th June. The matters enquired into are for the most part referred to in this report.

BOTANIC GARDEN.

During the year under report Mr. J. C. Nauen, trained at the Royal Botanic Gardens, Kew, was appointed Horticulturist. His work is reported on by Mr. Nauen. Within a few years the attractiveness of the

Station, and its usefulness both from practical and scientific standpoints should be greatly increased. Perhaps it may one day be deserving of the name of Botanic Garden.

AQUARIUM GROUNDS.

See the Horticulturist's Report for information on this subject.

THE LATE W. D. HOLLIS.

On 7th August, 1928, after a brief illness, William Dudley Hollis, a member of the Board of Agriculture, died in his fifty-second year. Appointed to the Board on 1st January, 1927, Mr. Hollis proved himself an extremely valuable member, for he was a man of extensive experience and sound judgment in agricultural matters. As a progressive agriculturist he will be missed. Kind, generous and honest in his dealings with his fellowmen, Mr. Hollis' untimely death cast a gloom over the community which knew him. His place on the Board will be difficult to fill.

STAFF.

Mr. E. A. McCallan, Director of Agriculture, was absent from the Colony on duty in the United States from 27th December, 1927, to 2nd January, 1928, and from 6th to 25th June. He was re-appointed to the Immigrant Labour Board and continues a member of the Marsh Reclamation Commission.

Mr. Lawrence Ogilvie, Plant Pathologist, retired from the Department on 8th April on appointment as Advisor in Economic Mycology for the Bristol Province under the advisory scheme of the Ministry of Agriculture and Fisheries.

Dr. H. S. Cunningham succeeded Mr. Ogilvie on 19th June. Because of an injury received when in the discharge of his duty, he was absent on sick leave from 3rd November to 8th December. He was absent in the United States from 26th December to 7th January, 1929, to attend at his own expense the meetings of the American Phytopathological Society and the American Association of Science, and to investigate, at Government expense, Bermuda bulbs under glass.

Mr. W. R. Evans, Frist Agricultural Assistant, acted as Officer-in-Charge during the absence of the Director in June. He was permitted to act as the temporary sceretary of the contemplated Lily Growers' Association. He was absent on sick leave from 27th February to 2nd March.

Mr. E. L. Adams, Inspector of Produce, was absent on sick leave from 28th January to 3rd February, from 26th March to 21st April, and from 30th May to 30th June.

Dr. R. L. Tucker, Government Veterinary Officer, was absent on vacation leave from 19th May to 26th June. Dr. F. W. E. Peniston acted as his locum tenens. Dr. Tucker was re-appointed to the General Board of Health.

Mr. J. C. Nauen was appointed Horticulturist from 16th May.

Mr. G. L. Young, Clerk, retired from the Department on 30th April on promotion to the post of Second Treasury Clerk. His services at the Station covered a period of nearly eleven years.

Mr. F. E. Adams, Junior Clerk of the Works Department, succeeded Mr. Young. He retired from the service on 16th July. During his attendance at the Volunteer Camp, from 7th to 17th June, Mrs. Ada M. Spershott acted as Clerk.

Miss Hilda C. Lines succeeded Mr. Adams as Clerk.

Mr. C. V. S. Early, Station Foreman, completed eighteen years with the Department on 23rd May.

Mr. T. Arthur Hollis, was appointed Assistant Inspector, and Messrs. E. C. Case, C. V. S. Early and A. W. Doe Sub-Inspectors.

FINANCIAL.

The expenditure of £4,310. 0. was authorised by The Appropriation Act of 1927, this sum being exclusive of salaries. The sum of £4,173.5.11. was expended, and a balance of £137.10. 3. remained at the end of the year. The sum of £157. 10. 8. was reimbursed to the Treasury, and produce to the vale of £265. 9. 3. was supplied to Government and other institutions. Details of receipts and expenditure will be found in the Appendices.

During the last ten years the expenditure (exclusive of salaries) and receipts have been as follows:

Year	Expenditure	Receipts
1919	£2,722 5 8	£ 157 18 0
1920	3,126 6 6	209 4 6
1921	5,488 15 2	176 1 11
1922	6,905 18 2	68 17 4
1923	4,163 6 10	75 0 11
1924	4,515 10 8	182 19 3
1925	4,851 16 7	129 18 9
1926	5,169 6 5	207 8 9
1927	4,560 15 5	346 2 4
1928	4,175 5 11	157 10 8

Respectfully submitted,

E. A. McCALLAN,
Director of Agriculture.

Agricultural Station, Bermuda.
23rd May, 1929.

Report of Plant Pathologist.

Director of Agriculture,

I have the honour to submit the following report covering the period from the date of my appointment (19th June) to the close of the year.

At this time I wish to state my appreciation of the warm welcome extended to me by yourself, the members of the Board of Agriculture, and by the farmers and people in general throughout the Colony. I am deeply indebted to you for your thoughtfulness, and for suggestions and advice regarding the numerous problems which require attention.

My predecessors, Professor H. H. Whetzel and Mr. L. Ogilvie, have done much to set forth the importance of pathological work, they have collected much valuable data, have outlined major problems to be dealt with, and with it all have done much towards solving certain of these problems. To both of these gentlemen I am indebted for helpful suggestions and advice.

During the past few years much has been done by the Department towards placing before the public the latest and most complete information regarding the cause of cerain plant diseases, the control measures as far as these are known, and at the same time, to a limited extent and at a very low rental, machinery has been provided for the application of these control measures. Many growers and gardeners have availed themselves of these advantages and have made a determined and consistent effort to combat many of the diseases and pests now causing serious losses throughout the Colony. On the other hand, many growers and gardeners have made no such effort and as a result it is much more difficult for those who do to make a success of their efforts.

One of the most striking features is the indifference to sanitary conditions as affecting the question of diseases in plants. During the winter season the crops on the whole are kept remarkably free from weeds. On the other hand, during the summer months it is quite a common thing to see fields producing a heavy crop of weeds which are allowed to remain undisturbed until the autumn planting season. Weeds are an uneconomic crop at any time, but when we consider that many of these weeds are the favourite host plants of insects which are destructive to cultivated crops and also of insects which are active in the spread of virus and other diseases, it is doubly apparent that the grower is only storing up trouble for himself when he allows a crop of weeds to stand on his fields during the summer months. Furthermore, such a condition is conducive to the carrying over of many soil organisms which are exceedingly difficult to control in the cultivated crop. The crop of weeds should be replaced by some suitable cover crop which would reduce the danger to a minimum.

The following are the most important diseases and pests noted during the period:

Banana.—The "Black-tip" disease of banana, caused by *Cercospora musarum*, was responsible for considerable loss in certain plantings during the season. An attempt was made to control this disease by the use of copper-lime dust.

Control measures consisted of dusting the bunches as soon as they were put out and at intervals thereafter until the bunches were practically full grown. The results of this treatment were so ununiform, as was also the extent of the infection on the checks, that no definite conclusions could be drawn. While there was little evidence of control by this method and

with the fungicides used, it is thought advisable to carry on more extensive experiments during the coming season, using a wide variety of fungicides.

Celery.—As in former years all celery seed imported into the Colony was subject to inspection for Septoria blight. The French seed being imported was again found to be remarkably free from this disease.

Cosmos.—Red spider *(Paratetranychus humidus)* was abundant on cosmos plants at the Station during August and September. This was satisfactorily controlled by means of sulphur dust.

Figs.—The fig trees throughout the Colony were severely attacked by the rust fungus *(Cerotelium fici)* causing an early dropping of the leaves and frequently resulting in almost complete defoliation. This disease can be controlled by persistent dusting with sulphur dust. Control measures should be commenced early, before the disease has become established.

The black scale *(Morganella longispina)* is common on fig trees and causes considerable injury.

Mealy bug.—The several species of insects coming under this heading constitute one of the more serious problems to the farmer and gardener of Bermuda and suitable control measures constitutes one of the major problems for the future. These insects were a serious pest of stored potatoes during the summer months and also did a vast amount of damage to numerous plants, trees, and shrubs.

Oleander.—Several outbreaks of the oleander scale *(Aulacaspis pentagona)* were reported during the summer, the most serious one being on Ireland Island. Spraying was resorted to in the more severe cases, although in most instances the parasite was found to be active.

One serious infestation of the black scale *(Morganella longispina)* was reported. This was satisfactorily controlled by spraying.

Palmetto.—I regret to report that early in November a severe infestation of the palmetto scale *(Comstockiella sabalis)* was found on the native palmetto *(Sabal blackburnianum)* growing at Shelly Bay. This is the first time this scale has been reported west of St. Georges. The owner wished to save the trees if possible and resorted to spraying, using lime sulphur. A thorough examination has been made of all of the palmettoes growing along the north shore from St. Georges to Mount Langton, and also of those growing in the vicinity of Harrington Sound. With the exception of the trees already mentioned, no further infestations were found. So far I have been unable to explain how this infestation occurred in view of the fact that no sign of the insect could be found between this point and St. Georges.

One badly infested tree was seen at St. Georges, and the owner has taken steps to clean this up and save the tree if possible. Scouting in the vicinity of St. Georges failed to reveal any other infested trees.

In December a shipment of parasitised scale was received from Dr. E. W. Berger, Florida State Plant Board. Parasites were reared from this shipment and liberated on St. Davids Island.

Papaw.—The black scale *(Morganella longispina)* is more or less common on papaws throughout the Islands. In at least two localities it became serious, and caused the death of a number of fine trees. This can easily be controlled by spraying with lime sulphur, 1-40.

Periwinkle.—A serious twig blight of the common Periwinkle was found in a garden in Paget. The fungus causing this trouble is evidently

a species of *Gloeosporium*, but is not identical with the organism collected by Ogilvie in 1927.

Potatoes.—The early crop of Triumps was severely injured in some localities by the fireworm (*Xylomyges eridania*). The early blight fungus *(Alternaria solani)* made its appearance in the potato fields during the latter part of November. During the month of December it caused considerable damage.

Tomatoes.—Septoria blight was common on tomatoes during October, causing rather severe injury in many cases.

Watermelons.—Severe injury to watermelons was caused during the month of July by the leaf-hopper *(Empoasca mali)*. As a result of this injury the crop was much reduced and much of the fruit was of poor quality. This loss could be largely avoided by spraying the vines with Bordeaux mixture.

Interceptions.—Sixteen consignments containing Narcissus bulbs and five consignments containing Lilium bulbs were seized. Three of these were returned to the United States through the Federal Horticultural Board. Five consignments of plants were fumigated and released.

Inspection Service.—During the period covered by this report 213 packages were examined at the Post Office and 288 at the docks.

Visits.—A total of 167 visits was paid to farms and gardens during this period.

Respectfully submitted,

H. S. CUNNINGHAM,
Plant Pathologist.

1st February, 1929.

Report of the First Agricultural Assistant.

Director of Agriculture,

I have the honour to submit my report on the operation of the Third Egg Laying Contest.

After a lapse of a year the third Egg Laying Contest was conducted on the poulrty farm of Mr. L. W. Howarth, Smiths Parish. Mr. Howarth generously undertook to erect the contest plant and operate the contest at no expense to the Government.

Site and Housing.—The site selected for the plant was located in a most favourable situation on the farm. The building was substantially constructed and fitted with every convenience for the comfort of the birds and the attendants.

Contestants.—Each pen consisted of six birds and one reserve bird. The following poultrymen entered pens:

Pen No.	Poultrymen	Address	Breed
1.	John Hallett	Pembroke, Bermuda	Rhode Island Red
2.	O. G. Mullin	Pembroke, "	Rhode Island Red
3.	Major H. H. Kitchener	Hinson's Island, "	Rhode Island Red
4.	Reginald Morris	Hamilton, "	Barred Rock
5.	Eric Frith	Pembroke, "	Barred Rock
6.	W. J. H. Trott	Pembroke, "	Barred Rock
7.	W. G. White	Southampton, "	Buff Rock
8.	Christensen Bros.	Pembroke, "	White Leghorn
9.	Marshall Farm	Alabama, U. S. A.	White Leghorn
10.	Hillside Orchard Farm	Canning, Nova Scotia,	White Leghorn
11.	Major H. H. Kitchener	Hinson's Island, Bermuda	White Leghorn
12.	William Gosling	Paget, "	White Leghorn
13.	G. W. Fisher	Devonshire, "	White Leghorn
14.	E. H. Barnes	Warwick, "	White Leghorn
15.	C. W. Hollis	Southampton, "	Ancona

Feeding.—The ration consisted of a commercial brand of feed purchased locally, Purina Chicken Chowder (mash) and Purina Hen Chow (scratch grain). The manufacturers' analysis for the former is protein 19%, carbohydrates not less than 55%, fat not less than 4% and fibre not more than 8%; and for the latter, protein 10%, carbohydrates 67%, fat 2.5% and fibre not more than 4%. The mash was kept before the birds at all times in self-feeding hoppers, and the grain was fed in the litter in the afternoon, except once a week when about one ounce of cod liver oil was added to the grain and fed in the hoppers.

As the birds were confined in ungrassed runs, miscellaneous green feed from the farm garden was fed from the commencement of the contest until the end of May. From the beginning of June to the end of the contest soy-bean plants were fed.

Grit and oyster shell were kept before the birds at all times. Epsom salts at the rate of one pound per one-hundred birds was fed once a fortnight in wet mash throughout the year. Sulphur at the rate of one pound per one-hundred birds was fed fortnightly in wet mash alternately with the Epsom salts from the beginning of May to the end of the contest.

Results of Contest.

RELATIVE POSITIONS OF PENS.

Position	Pen No.	Breed	Eggs Laid: Special Grade	First Grade	Second Grade	Points
1st	2	Rhode Island Red	528	342	16	1,014
2nd	8	White Leghorn	78	751	194	994
3rd	9	White Leghorn	80	507	457	949¾
4th	11	White Leghorn	18	598	358	889
5th	3	Rhode Island Red	33	461	460	847¼
6th	1	Rhode Island Red	156	571	75	822¼
7th	4	Barred Rock	29	487	358	791¾
8th	15	Ancona	6	352	375	640¾
9th	10	White Leghorn	8	432	223	609¼
10th	7	Buff Rock	70	399	65	535¼
11th	14	White Leghorn	–	335	259	529¼
12th	13	White Leghorn	2	163	451	503¾

Pens Nos. 5, 6 and 12 were withdrawn from the contest.

HIGHEST MONTHLY RECORDS OF PENS, HEAVY BREEDS:

Month	Pen No.	Breed	Eggs Laid: Special Grade	First Grade	Second Grade	Points
1st	2	Rhode Island Red	65	32	–	113¼
2nd	1	Rhode Island Red	25	41	9	79
3rd	1	Rhode Island Red	16	71	6	95½
4th	1	Rhode Island Red	19	84	7	113
5th	2	Rhode Island Red	94	20	–	137½
6th	2	Rhode Island Red	63	50	–	128¾
7th	2	Rhode Island Red	56	38	–	108
8th	4	Barred Rock	5	40	40	83
9th	2	Rhode Island Red	33	35	4	79½
10th	4	Barred Rock	–	35	31	53¼
11th	2	Rhode Island Red	27	28	1	62½
12th	2	Rhode Island Red	15	14	2	34¼

HIGHEST MONTHLY RECORDS OF PENS, LIGHT BREEDS:

Month	Pen No.	Breed	Eggs Laid: Special Grade	First Grade	Second Grade	Points
1st	10	White Leghorn	2	45	36	74½
2nd	11	White Leghorn	4	60	30	86¾
3rd	11	White Leghorn	2	76	22	95
4th	9	White Leghorn	12	69	36	111
5th	9	White Leghorn	14	59	47	111¾
6th	8	White Leghorn	13	102	7	123½
7th	8	White Leghorn	6	84	17	104¼
8th	8	White Leghorn	3	68	30	94½
9th	8	White Leghorn	1	65	15	77½
10th	9	White Leghorn	3	57	25	79½
11th	9	White Leghorn	0	40	30	73¾
12th	8	White Leghorn	1	35	14	46¾

HIGHEST MONTHLY RECORDS OF INDIVIDUALS, HEAVY BREEDS:

Month	Pen No.	Bird No.	Breed	Eggs Laid: Special Grade	First Grade	Second Grade	Points
1st	2	4	Rhode Island Red	19	–	–	23¾
2nd	1	2	Rhode Island Red	17	4	1	26
3rd	1	2	Rhode Island Red	10	13	–	25½

Month	Pen No.	Bird No.	Breed	Eggs Laid: Special Grade	First Grade	Second Grade	Points
4th	1	2	Rhode Island Red	9	13	–	24¼
5th	1	2	Rhode Island Red	10	15	–	27½
6th	2	2	Rhode Island Red	18	3	–	25
7th	2	4	Rhode Island Red	17	2	–	23¼
8th	1	2	Rhode Island Red	16	4	–	24
9th	7	1	Buff Rock	–	15	4	18
10th	4	2	Barred Rock	–	11	6	15½
11th	1	2	Rhode Island Red	13	3	–	19¼
12th	2	2	Rhode Island Red	10	7	1	20¼

HIGHEST MONTHLY RECORDS OF INDIVIDUALS, LIGHT BREEDS:

Month	Pen No.	Bird No.	Breed	Eggs Laid: Special Grade	First Grade	Second Grade	Points
1st	8	4	White Leghorn	10	10	–	22½
2nd	11	3	White Leghorn	4	14	–	19
3rd	8	6	White Leghorn	1	16	–	19½
4th	9	6	White Leghorn	–	18	3	20¼
5th	9	3	White Leghorn	14	6	1	24¼
6th	9	3	White Leghorn	13	7	–	23¼
7th	9	3	White Leghorn	14	9	–	26½
8th	9	3	White Leghorn	6	14	–	21½
9th	10	1	White Leghorn	–	16	4	19
10th	9	3	White Leghorn	1	17	1	19
11th	8	3	White Leghorn	1	19	1	21
12th	9	5	White Leghorn	–	5	16	17

N.B.—Special grade eggs were counted as 1¼ points, first grade eggs as 1 point and second grade eggs as ¾ point each. Qualifying weight of eggs: during the first period of four weeks; special grade not less than 2 2/16 ozs., first grade not less than 1 14/16 ozs., and second grade not less than 1 10/16 ozs.; during the second period of four weeks each grade to be 1/16 oz. heavier than the corresponding grades for the first period; for the remainder of the contest each grade to be 1/16 oz. heavier than the corresponding grade for the second period. Eggs below second grade and those of bad shape or soft-shelled were not counted.

PRIZE WINNERS.

Gold medal for highest scoring pen in contest	O. G. Mullin
Silver cup for highest scoring heavy breed pen	O. G. Mullin
Silver medal for second highest scoring heavy breed pen	Major H. H. Kitchener
Bronze medal for third highest scoring heavy breed pen	John Hallett
Silver cup for highest scoring light breed pen	Christensen Bros.
Silver medal for second highest scoring light breed pen	Marshall Farm
Bronze medal for third highest scoring light breed pen	Major H. H. Kitchener
Gold medal for highest scoring individual in contest	O. G. Mullin
Silver medal for second highest scoring heavy breed individual	O. G. Mullin
Bronze medal for third highest scoring heavy breed individual	John Hallett

Silver medal for highest scoring light breed individual	Christensen Bros.
Silver medal for second highest scoring light breed individual	Marshall Farm
Bronze medal for third highest scoring light breed individual	Christensen Bros.

Certificates were awarded to the owners of the highest scoring pens and the highest scoring individuals in each section during each four weeks' period of the contest.

SUMMARY.

Total number of birds competing	72
Mortality	5.3%
Total number of eggs laid and given official credit	816 5/12 doz.
Average number of eggs laid per bird	136.06
Average number of eggs laid by heavy breeds (30 birds)	135
Average number of eggs laid by light breeds (42 birds)	136.08
Highest individual record, heavy breed	214½ points
Highest individual record, light breed	203½ points
Amount of food consumed per bird	86 pounds
Average value of food consumed per bird	13/8
Average value of grit, shell and medicines supplied per bird	10d.
Total value of food and medicines consumed	£ 52 14 0
Value of eggs sold at average rate of 3/- per dozen for specials and firsts, and 2/6 per dozen for seconds	£114 7 1½
Average value of eggs sold per bird above cost of food	17/1½

N.B.—The above figures refer only to the twelve pens which completed the contest.

Respectfully submitted,

W. R. EVANS,
First Agricultural Assistant.

Agricultural Station, Bermuda,
28th January, 1929.

Report of the Inspector of Produce for the Season of 1927-1928.

The Director of Agriculture,

I have the honour, under the provisions of The Agricultural Inspection Act, 1921, to present my report of the inspection of seed potatoes, produce, box material and lily bulbs, as well as of other duties performed.

INSPECTION OF SEED POTATOES.

Triumphs.—Imported from Long Island, N.Y., between 16th August, 1927, to 31st March, 1928, 4,438 barrels. Early in 1928 there were imported from Nebraska 600 barrels for March planting.

Garnets.—From Nova Scotia 9,554 barrels, and from Prince Edward Island 319 bags (90 pounds each).

Irish Cobblers.—From Nova Scotia, 550 barrels.

Quality of Seed.—The Triumph seed was sound, and free from scab and other tuber defects. Some of the Long Island tubers were small, and some barrels were slack; the importation as a whole was satisfactory. The Garnet seed was of the best quality with respect to the appearance of the tubers. The Cobbler seed was small, and quite inferior to former importations of this variety.

INSPECTION OF PRODUCE.

The first shipment of potatoes was on 16th November, and the first shipment of green vegetables on 6th December.

The following comments are made on the various vegetables shipped:

Beets were not as good as those of the previous year.

Carrots were on the whole good, but excessive tops should be cut off. Too many small carrots were shipped.

Celery was good throughout the season. Very little blight appeared, but some black-heart during the latter part of the season.

Kale was good, with freedom from yellow leaves.

Onions were of poor quality and small in quantity.

Parsley was good throughout the season.

Potatoes.—A large proportion of the Fall Triumph crop (about 40 per cent) was grown from Bermuda seed. The Garnet crop was exceptionally large. Owing to low prices in New York at the close of the season, there remained several thousand barrels in the Colony which would have been shipped had prices been more favourable. Great loss from rot occurred, especially in those stored under the sheds at the dock. Because of dry weather the yield of Cobblers was small.

Tomatoes.—The tomato crop was smaller than in the preceding year, but the fruit was better packed when offered for shipment.

Produce Rejected.—The following percentages were rejected on first inspection:

Celery	1.5 per cent
Kale	0.1 "
Onions	0.3 "
Potatoes	1.1 "
Tomatoes	8.0 "
Other vegetables	1.6 "

Much of the above was passed when inspected the second time after corrections had been made in it.

Appeals and Prosecutions.—One appeal and no prosecutions.

QUANTITIES SHIPPED.

	United Kingdom	Canada	West Indies	United States	Other Countries	Total	
Beets	—	73	—	15,507	—	15,580	bushels
Carrots, bunched	—	4,458	21	15,799	—	42,250	"
Carrots, loose	—			21,972	—		
Celery	—	35	—	64,598	—	64,633	crates
Kale	—	—	—	13,827	—	13,827	"
Lettuce	—	5	—	1,373	—	1,378	bushels
Onions	—	11,205	1,980	2,878	—	16,063	"
Parsley	—	—	—	60,318	—	60,318	"
Potatoes	—	115	375	40,811	—	41,301	barrels
Tomatoes	—	4,752	—	—	—	4,752	crates
Turnips	—	—	—	1,473	—	1,473	bushels
Miscellaneous	—	664	141	468	—	1,273	bushels
Lily bulbs	200	291	—	7,064	56	7,611	cases

Total number of green vegetables shipped, 294,623 bushels.

Supervision of Chill-Rooms.—Throughout the shipping season the chill-rooms on the boats were frequently inspected by Sub-Inspector Case and myself, and I have the satisfaction of reporting that the stowage was good at all times. Breakage of crates was much less than in former years, due in large measure to better crate material.

Assistant Inspector in New York.—The Assistant Inspector of Produce, Mr. T. A. Hollis, Jr., was in New York a considerable part of the season. The quantities shipped by each boat were cabled to Mr. Hollis, and information regarding the crop was forwarded him by letter.

Acknowledgement.—I wish to record my personal appreciation of the courtesies of the Wharfingers, the Dock Purser, and the Chief Engineer of the "Fort Victoria" in connection with the loading and carrying of the crops.

INSPECTION OF BOX MATERIAL.

Under Regulations made by the Board on 13th September, 1927, all box material imported was inspected. The importations were of better quality than those of former years.

INSPECTION OF LILY BULBS.

Bulb inspection began on 6th July and continued at six packing sheds until the latter part of August. The bulbs were superior to those of former years, and the crop was the largest yet reaped. Basal rot was but little seen. The field inspections of the Plant Pathologist rendered much easier my inspections at shipping time.

FARMERS' MARKET.

As the Market was put into permanent quarters late in the year, it should increase in usefulness. During the year under report a varied lot of produce was offered for sale, but the vendors were often no more than one.

SUMMER DUTIES.

Other summer duties were reported on monthly.

RECOMMENDATIONS.

Carrots and Other Root Crops.—In growing carrots and other root crops, less nitrate of soda should be used than is the general practice. The seed should be sown thinly, to avoid small over-crowded roots or the necessity of thinning.

Packing Houses.—A central packing house should be provided for tomatoes as soon as practicable, also one for lily bulbs.

Farmers' Meetings.—More frequent farmers' meetings should do much to educate farmers to pack better stuff.

Respectfully submitted,

E. L. ADAMS,
Inspector of Produce.

Devonshire,
5th January, 1929.

Report of the Government Veterinary Officer.

The Director of Agriculture.

I have the honour to submit my report for the year 1928.

I am pleased to be able to report no serious outbreak of any disease among our live stock, that the conditions of housing are improving, and that live stock owners are beginning to appreciate that care is essential in keeping stock. Bovine tuberculosis, in particular, has diminished to a remarkable degree.

A disease which gives dairymen some inconvenience, not to mention financial loss, is contagious abortion. This disease, until very recently, was thought to be confined to the bovine family, but recent investigations show that there is some relationship to the disease in the human family known as Malta or undulated fever. It is hoped that in the near future, with the assistance of the Health Department, control may be secured.

My duties have at times been made more or less difficult to perform by reason of the lack of co-operation of some live stock owners in the methods advised for the prevention of disease. During the years 1915 to 1920, when most pig raisers were asking for a cure or prevention of that dreaded disease, swine plague or hog cholera, vaccination against this disease was readily accepted, but after the disease had been stamped out it was difficult to get the owners of hogs to realise that vigilence was absolutely necessary.

The steamship companies acting as carriers of live stock have improved their methods of conveying stock. Horses and cattle are better protected from the weather, while poultry and pigs are made more comfortable by being supplied with more commodious crates; the companies refusing to accept any crated animal unless the regulations pertaining thereto have been complied with.

During my incumbency of the office, which has been more than sixteen years, the increase of pure-bred dairy stock in the Colony has been very gratifying, and it would be a retrograde movement to discontinue the importation and breeding of good stock. I would advise breeders of live stock, especially cattle and poultry, to continue to improve their stock. I would advise registration of pure-bred animals. I can see no reason why Bermuda should not produce stock that would create a demand in outside markets. The West Indies are continually importing pure-bred and grade cattle. Why should we not enjoy some of this trade?

I would like to refer before closing to the excellent methods of the Board of Health in encouraging the production of clean milk, and to the commendable activity of the Bermuda Poultry and Pet Stock Association.

Respectfully submitted,

R. L. TUCKER,
Government Veterinary Officer.

Brightside, Flatts,
6th June, 1929.

Report of the Horticulturist.

Director of Agriculture,

I have the honour to submit my report for the period 17th May to 31st December, 1928.

GENERAL WORK AT STATION.

Glasshouses.—These were maintained in good order, and many improvements were effected. All plants were repotted when necessary, and many new additions were made.

A rockery was made in No. 2 Fernhouse, which displayed the ferns to much better advantage. Three rustic columns were also added for climbing ferns. The re-arrangement and labelling of the glasshouse plants, with botanical and common names as well as habitat, provided much interest to visitors.

The wooden staging in No. 3 House was replaced by a concrete one. A propagating frame was made in No. 5 House, which proved invaluable. Repairing and painting the houses was completed, except in No. 1 House. It is hoped that this work will not be delayed, as the house is badly needed, being used for propagation of imported seeds.

Grounds.—These were kept up to the usual good standard, and many additional plantings were made. Flower beds were planted with seasonable plants and maintained in good order as far as possible, as were also the lawns, hedges and driveways.

The section of ground between the main drive and the citrus orchard was cleaned out, much to the benefit of citrus trees and palms, and opened up a view of the orchard from the driveway. Some palms were planted to extend the row along the driveway and to fill in gaps.

The orchard was pruned on one occasion of dead and other undesirable wood, and gone over on several occasions for water-sprouts and sucker growths. The ground between the citrus trees was forked over and soybeans planted.

A row of Royal Palms *(Oreodoxa regia)* was planted at the southern end of the new nursery. These have made good growth. Several additions were made to shrub collections. Trees were also planted in suitable positions. Several Juniper trees as well as Fiddlewoods were cut down to allow for new plantings or for others to develop.

A collection of five-hundred Tung Oil *(Aleurites Fordii)* plants were planted during the late summer as an experiment and proved quite successful. Other surplus plants and cuttings also were planted. The northern end of the new nursery was used as a seed-bed. Part of the office plot was marked off into five rectangular beds, to be planted with economic plants according to their uses. Turfing of pathways was accomplished, but no plants were planted.

Labelling.—Most of the species of trees and shrubs were labelled with scientific and common names also habitat. Owing to the many duplicate specimens scattered about the grounds, it was impossible to label all trees, but labels were placed on conspicuous and roadside trees.

Lead labels similar to those used in the Royal Botanic Gardens, Kew, England, were used. These should prove invaluable to Bermuda, as they do not corrode, and the names, being imprinted in the lead, will not become obliterated.

There is much room for improvement. Many duplicate trees—as Fiddlewood *(Citharexylum quadrangulare)*—should be eradicated to give room for new plants.

Seed Sowing.—Early sowings of annuals resulted in very poor percentages of germination. This cannot be wholly blamed on the seed, as sowings made at a later date proved more successful, especially the late November sowings.

It has long been debated whether seeds imported from England and the United States of America for early sowings, i.e. September, are then stale. This is the case, as such seed must have been ripened the previous autumn. Efforts have been made to get in touch with Australian and New Zealand seedsmen, as their autumn corresponds with our spring, and seeds ripened and despatched would reach this Colony in good time for sowing. Much fresher seeds would result.

Acknowledgement of Seeds and Plant Received.—Efforts to secure seeds and plants from botanic gardens and like bodies have resulted in over four-hundred and fifty new species being introduced. Selections have been made of plants considered suitable, and it is hoped that the major portion will do well here. The Horticultural Section is greatly indebted to the undermentioned for contributions of seeds and plants.

Dr. A. W. Hill, Director, Royal Botanic Gardens, Kew, England; Dr. N. L. Britton, Director, Botanic Gardens, New York, U.S.A.; the Director, Botanic Gardens, Dunodin, New Zealand; the Director, Botanic Gardens, Melbourne, Australia; the Director, Department of Agriculture, Jamaica, B. W. I.; Dr. P. F. Hamblin, Director, Harvard University, Botanic Garden, Cambridge, Massachussets, U. S. A.; the Director, Botanic Gardens, Singapore, Straits Settlements; the Superintendent, Palace Gardens, Khatoum, Souden; the Director, Division of Botany, Ottawa, Canada; the Director, Royal Botanic Gardens, Edinburgh, Scotland; the Superintendent, Hyde Park, London, England; the Director, Botanic and Forestry Department, Hong Kong; the Director, Botanic Gardens, Kakgola, Ceylon; the Director, Brignoles Botanic Garden, Brignoles, France; the Director, Ministry of Agriculture, Botanic Section, Giza, Egypt; Mr. C. T. White, Government Botanist, Brisbane, Australia; the Director, Department of Agriculture, Kampela, Uganda; Mr. K. Yashiroda, Konosho-Kyoku, Kogawaken, Japan; the Director, Division of Bast-fibre Investigation, Turkistan Plant Breeding Station, Tashkeht, U.S.S.R.; the Director, Kokkaido Agricultural Experiment Station, Sapporo, Japan; and the Director, Division of Botany, Ministry of Commerce, Bengkok, India.

We are also indebted to the undermentioned local subscribers.

His Excellency Lieutenant-General Sir Louis Jean Bols; Victoria Park, Hamilton; Somers Garden, St. Georges; Mrs. Whitney Black, Pembroke; Mr. J. J. Bushell, M.B.E., Devonshire; Mr. T. O. Covel, Devonshire; Mr. Freer Cox, Devonshire; Miss Amy Doe, Paget; Mrs. A. W. Doe, Paget; Reverend Canon E. C. Earp, Smiths; Miss Mary Gray, Paget; Miss May C. Hutchings, Paget; Rev. A. P. Kirkpatrick, Paget; Mr. L. L. Mowbray, Flatts; Wor. J. Scott Pearman, J.P., M.C.P., Smiths; Mr. W. H. Potter, Pembroke; Mr. C. F. Rogers, Paget; Mr. H. R. T. Smith, St. Davids; and Mr. S. E. Williams, Devonshire.

Despatches of Seeds, Plants, etc.—Seeds and spores were despatched abroad to the undermentioned.

Dr. A. W. Hill, Director, Royal Botanic Gardens, Kew, England; the Superintendent, Lawrence Gardens, Lahore, India; Mr. K. Yashiroda, Konosho-Kyoloi, Kagawaken, Japan; the Superintendent, Hyde Park, London, England; the Director, Division of Bast-fibre Investigation, Turkistan Plant Breeding Station, Tashkeht, U.S.S.R.; the Director, Harvard University Botanic Garden, Cambridge, Massachussets, U.S.S.; the Director, Beal Botanic Garden, East Lansing, Michigan, U.S.A.; the Director, Royal Botanic Gardens, Edinburgh, Scotland; the Director, Botanic Garden, Glasgow, Scotland; the Director, Hortus Botanicus, University of Zurich, Zurich, Switzerland; the Director, Hortus Botanicus, Berlin-Dahlem, Germany; the Director, Hortus Botanicus, University of Montpelier, France; the Director, Hortus Botanicus, Amsterdam, Holland; the Director, Hortus Botanicus, University of Copenhagen, Denmark; the Director, Hortus Botanicus, Warsaw, Poland; the Director, Bureau of Plant Industry, Department of Agriculture, Washington, D.C., U.S.A.; the Director, Hortus Botanicus, Kannas, Lithuania; the Director, Hortus Botanicus, Algiers, Northern Africa; and the Director, Brignoles, Botanic Garden, Brignoles, France.

The following are approximate local despatches; bulbs, 1,600; plants, 500; cuttings, 1,000; and seed packets, 50.

Seeds, spores, cuttings and plants of endemic and naturalized plants were collected, many of which were sent abroad.

Some other methods to deal with surplus stock of plants should be considered. Plants grown in the nursery at the present time for arbor societies are still on hand. This also applies to Tung Oil. Few requests have been received in spite of repeated advertisements of plants free of charge.

PLANTING OF AQUARIUM GROUNDS.

The general laying out and planting of the Aquarium grounds was deferred until late summer, as it was impracticable to plant or even to lay out the grounds during the heat of the summer. The plans were adhered to as far as possible, and a formally designed garden was made in the triangular space in front of the building. This was not completed, as stones for the pathways were not procurable. Bulbs were planted in some beds and annuals were resorted to for the remainder.

Two plots in front of either wing of the building were graded and grass sown. Beds were cut out, one on the western side and three on the eastern, with a narrow border running the whole length of the building wall to the front. This was planted with Hippeastrum bulbs, and other beds with bulbs and annuals.

A bed running at right angles to the road and along the oleander hedge was also prepared. This was partly planted with succulent plants.

Palms and a few shrubs were planted on either lawn, and on the bank at the north-western end of the building. A double row of Cocoanuts *(Cocos Nuclfera)* was planted along the shore front on the opposite side of the road.

Prison labour was used until planting commenced, when a man was set on part-time to take care of the grounds and planting and on charge to the Aquarium.

We are indebted to Reverend Canon E. C. Earp, Smiths; Mr. Freer Cox, Devonshire; Wor. J. Scott Pearman, J.P., M.C.P., Smiths; and Mr. F.

T. Rowley, Paget, for their contributions of plants. Other plants were procured from the Somers Garden, St. Georges, and the Station.

PUBLICATIONS.

A seed exchange was published at the end of November and circulated to Botanic Gardens and other institutions. It consisted of four mimeographed sheets containing some 175 plant names, arranged alphabetically.

VISITS AND ADDRESSES.

Recorded visits for the period covered numbered 127. Meetings of the Somerset, Southampton, Warwick and Pembroke Arbor Societies and the Bermuda Garden Club were attended and addressed.

Respectfully submitted,

J. C. NAUEN,
Horticulturist.

23rd January, 1929.

APPENDIX A

Expenditure (Exclusive of Salaries) for the Year Ended 31st December, 1928.

1. FEES TO MEMBERS OF BOARD.

Appropriated by Act No. 49, 1927				£70	0	0
Paid to members for attendance .....£	50	0	0			
Unexpended balance	20	0	0			
	£70	0	0	£70	0	0

2. GENERAL GRANT.

Appropriated by Act No. 49, 1927				£2,200	0	0
Labour on experimental plots, lawns, flower beds, glasshouses and drives, and care of live stock .....£	1,498	19	10			
Prison labour	26	8	6			
Carting and ploughing	73	11	1			
Manure and fertilisers	5	1	3			
Seed potatoes, seeds, bulbs and plants	74	5	5			
Live stock—feed, bedding and incidentals for	254	12	3			
Repairs and renewals of buildings, tools, implements, etc.	124	7	2			
Furniture	24	19	1			
Cleaning offices	17	18	3			
Stationery and printing, local	63	16	5			
Stationery and printing, foreign	8	1	8			
Agricultural Clubs, prizes to	1	0	0			
Foreign postage	4	0	0			
Sundry	22	3	9			
Unexpended balance	–	15	4			
	£2,200	0	0	£2,200	0	0

3. INSPECTION SERVICES, MARKET INVESTIGATIONS AND CONTINGENCIES.

Appropriated by Act No. 49, 1927				£1,020	0	0
Inspection at dock .....£	256	13	1			
Inspection of seed potatoes in the United States	45	2	8			
Representation in New York	273	6	11			
Inspection of lilies by Mr. C. E. F. Guterman, Lily Disease Investigation Fellowship	27	3	2			
Advertising lily bulbs in England by distribution and advertisements ...	126	7	1			
Cables	44	9	3			
Equipment of Farmers' Market	46	4	10			
Subscription to periodicals	6	1	10			
Furniture	15	17	4			
Box material for direct-to-the consumer packages	19	19	4			
Printing, local	35	15	0			
Half cost of passage money of the Plant Pathologist to New York to inspect lilies	7	5	10			
Supplies and contingencies	61	5	8			
Unexpended balance	54	8	0			
	£1,020	0	0	£1,020	0	0

4. ERADICATION OF ANIMAL DISEASES.

Appropriated by Act No. 49, 1927				£	75	0	0
Compensation to owners of condemned stock	£	20	0	0			
Supplies and contingencies		7	9	1			
Unexpended balance		47	10	11			
	£	75	0	0	£	75	0	0

5. PURPOSES OF PLANT AND BULB DISEASES AND PESTS ACT.

Appropriated by Act No. 49, 1927				£	200	0	0
Labour	£	7	13	6			
Fungicides and insecticides		23	6	10			
Equipment, etc.		131	12	1			
Printing "The Insects of Bermuda" ..		36	11	4			
Unexpended balance		–	16	3	–	–	–
	£	200	0	0	£	200	0	0

6. IMPROVEMENT OF LIVE STOCK.

Appropriated by Act No. 49, 1927				£	50	0	0
Purchase of breeding stock	£	15	11	6			
Supplies and contingencies		34	6	2			
Unexpended balance		–	2	4			
	£	50	0	0	£	50	0	0

7. ANNUAL EXHIBITION.

Appropriated by Act No. 49, 1927				£	300	0	0
Labour, materials and contingencies .	£	300	0	0	–	–	–
	£	300	0	0	£	300	0	0

8. PURCHASE OF BOOKS AND SCIENTIFIC APPARATUS.

Appropriated by Act No. 49, 1927				£	25	0	0
Apparatus, books and contingencies .	£	24	10	2	–	–	–
Unexpended balance		–	9	10	–	–	–
	£	25	0	0	£	25	0	0

9. DEPARTMENTAL CONTINGENCIES, TRAVELLING EXPENSES OF OFFICERS OF DEPARTMENT, TELEPHONES, LIGHTING, ETC.

Appropriated by Act No. 49, 1927				£	120	0	0
Carriage hire	£	51	9	4			
Boat transportation		–	15	0			
Telephones		13	4	7			
Electric light and power		10	2	0			
Printing, local		27	1	9			
Foreign postage		8	10	0			
Supplies and contingencies		8	17	4			
	£	120	0	0	£	120	0	0

10. HORTICULTURE.

Appropriated by Act No. 49, 1927				£	150	0 0
Plants, seeds and bulbs	£	43	0 1			
Labour		30	12 0			
Cartage		5	9 0			
Supplies and contingencies		70	18 0			
Unexpended balance		–	– 11			
	£	150	0 0	£	150	0 0

11. RENT ALLOWANCE TO PLANT PATHOLOGIST.

Appropriated by Act No. 49, 1927				£	100	0 0
Expended	£	86	13 4			
Unexpended balance		13	6 8			
	£	100	0 0	£	100	0 0

APPENDIX B

Statement of Reimbursements to Government, and Value of Produce Supplied to Other Institutions During the Year Ended 31st December, 1928.

1. REIMBURSEMENTS TO GOVERNMENT.

Sale of vegetables	£	46	2 10
Sale of plants		12	3 9
Sale of breeding stock		31	0 0
Live stock fees		43	13 0
Registration fees from seedsmen		3	0 0
Spraying services		18	16 9
Miscellaneous receipts		2	14 4
	£	157	10 8

2. PRODUCE SUPPLIED TO OTHER INSTITUTIONS.

Milk to King Edward VII Memorial Hospital	£	80	9 8
Vegetables to King Edward VII Memorial Hospital		105	0 11
Vegetables to other institutions		71	1 8
Plants to bazaars		3	17 0
Firewood to other institutions		5	0 0
	£	265	9 3